495414

STUDY OF THE INTERIOR FIRE PROTECTION REQUIREMENTS OF THE EXTERIOR COLUMNS FOR THE WORLD TRADE CENTER PROJECT

April 8, 1968

Prepared by:

M. Malter

M. Malter, P.E.
Manager - Fire Protection
ZONOLITE DIVISION
W. R. Grace & Co.

20062566

WORLD TRADE CENTER
NEW YORK CITY

Abstract:

The World Trade Center is utilizing column construction which is unusual in its demands for termal insulation and fire protection.

In an effort to provide the proper fire protection and provide heat flow into the column it was felt that a dense vermiculite-gypsum plaster could best fulfill the needs. Sand-gypsum plaster would allow more heat into the column, but could not obtain the proper fire rating. Conversely Mono-Kote would get the fire rating, but would block the heat flow.

In an effort to satisfy the requirements this study is being submitted for approval. The study shows that a 1:2 vermiculite-gypsum plaster can be used in lieu of Zonolite Mono-Kote to provide 4-hour fire protection on the proposed column.

20062567

WORLD TRADE CENTER
NEW YORK CITY

Purpose:

The purpose of this report is to show that a 1:2 vermiculite-gypsum plaster can be used in lieu of Zonolite Mono-Kote when applied to a large column to provide .4-hour fire protection. It will be shown that the fire resistance period of a 1:2 vermiculite-gypsum plaster is equivalent to that of Zonolite Mono-Kote.

The temperature end-point criteria of 1000F average from ASTM E119 "Fire Tests of Building Construction and Materials" is used as the standard for determining the equivalency of the two materials.

Test Data:

Underwriters' Laboratories, Inc., Report R 4339-5* dated August 14, 1961, was a full scale fire test of a floor-beam construction. The beam in this report utilized a 1:2 vermiculite-gypsum plaster at a thickness of 7/8 inches. The fire resistance period of the beam based on 1000F average is 197 minutes.

20062568

*Underwriters' Laboratories, Inc., green book reports included in study.

WORLD TRADE CENTER
NEW YORK CITY

Underwriters' Laboratories, Inc., Report R 3789-5* dated January 29, 1964, was a full scale fire test of a floor-beam construction. The beam in this report was Zonolite Mono-Kote and was applied to a thickness of 7/8 inches. The fire resistance period of the beam based on 1000F is 151 minutes.

*Underwriters' Laboratories, Inc., green book reports included in study.

20062569

WORLD TRADE CENTER
NEW YORK CITY

Conclusions:

It is obvious from the test data available that under similar conditions the 1:2 vermiculite-gypsum plaster had a fire resistance period of 46 minutes longer than that of Zonolite Mono-Kote.

It is also known that Zonolite Mono-Kote is a mill-mixed vermiculite-gypsum product in proportions other than 1:2.

Based on the above information and available test data, a 1:2 vermiculite-gypsum plaster could replace the Zonolite Mono-Kote as shown in the U.L. Building Materials List Column Design 37-4 hour.

If it is acceptable in Design 37-4 hour then surely it should be valid for the columns of the World Trade Center.

20062570

Suggestions to NYC DOH re: possible environmental asbestos contamination
September 23, 2001

Introduction:

Subsequent to the recent attack on the World Trade Center (WTC), concerns of wider spread environmental asbestos and other contamination have been raised. The general purpose of this communication is to recommend the development of a focused but comprehensive environmental sampling plan which will, 1) scientifically assess the nature and extent of dust and debris which was spread throughout the metropolitan area of lower Manhattan following the collapse of the WTC, 2) acquire specific, exposure-based environmental data specifically designed to allow focused human health (both short and long term) for commercial business owners, city workers, and the public who may be exposed to environmental contaminants and asbestos in dust and debris as they return to their homes and places of business, 3) provide specific chemical and geographic information regarding environmental asbestos contamination if specific cleanup is required. In order to address these concerns with regard to environmental asbestos contamination beyond the immediate vicinity of the WTC collapse, which includes both outdoor and indoor (e.g., offices, apartments) situations, we suggest that the following recommendations be considered and used to refine sampling, analysis, and quality assurance project plans consistent with applicable State and Federal guidance. Of note, information concerning other potentially harmful contaminants (e.g., lead) can also be easily obtained, as indicated, as a compliment to asbestos assessment efforts.

General Objectives:

Rapidly provide information concerning actual or potential exposures and risks associated with possible asbestos contamination of the area surrounding the WTC subsequent to the attack on September 11, 2001. This information is essential to help representatives from the NYC DOH make focused and efficient management decisions and develop appropriate recommendations to ensure the health and well-being of area workers and residents that may be exposed.

All Plans should include the following minimal elements to assure the highest quality data for appropriate public health decision-making:

1) Written sampling plan developed according to standard guidance
2) Standard operating procedures (SOPs)
3) Scientific quality assurance including sampling logs and chain of custody information
4) Sample archiving for possible future analyses

Specific Objectives:

- **Area-wide environmental characterization**: Solid media sampling

should include: stratified random and representative characterization of solid (soil, dust, and debris) media throughout affected area. Affected area may be defined by several modalities including direct observation, remote sensing data (ie. Aerial photography, AVIRIS (infrared) evaluation for asbestoform minerals), and direct sampling.
Suggest five point composite at each sampling location where applicable.

1) Due to uncertainties associated with asbestos analysis, chemical and fiber measurement should be diverse and include: 1) polarized light microscopy (PLM)

(NIOSH-9002), 2) scanning electron microscopy (SEM) coupled with electron dispersive spectroscopy (EDS) for fiber chemical analysis and, 3) visible infrared spectroscopy (IR). Of note: it is expected that a wide variety of fiber types may be present. To avoid mischaracterization it is recommended that chemical analysis be conducted for positive fiber identification. Suggest archiving all samples for possible future analyses (possibly including dioxin, PCBs, metals, radionuclides, and structural failure analyses).

2) Source Characterization: Solid Media Sampling
Representative bulk samples of likely asbestos containing source material (i.e., fire proof coating on structures (Monokotes 1 and 2), concrete floor decking, and foundation materials)

- **Environmental Area Characterization: Ambient and Perimeter Air Sampling:**

Environmental Characterization through ambient air monitoring
Representative, stratified random samples should be collected daily for the purpose of characterizing ambient air. Samples should be collected and analyzed for a sufficient duration to provide information regarding asbestoform mineral fibers and particulate (pm10 and pm2.5). Suggest perimeter sampling around main construction area and systematically throughout affected area as defined above. Samples should be collected and analyzed daily to provide rapid information during changing meteorological conditions. Meteorological data should be collected and coupled with airborne dust analysis. More comprehensive analysis to provide information useful for long term risk analysis should be considered.

Air sampling and analysis should be conducted such that sufficient analytical sensitivity for asbestos attained is at or below previous ambient levels found for NYC (possibly 0.0001 f/cc for non-contaminated atmospheres). All samples should be collected such that direct microscopic analyses by light and electron microscopy are possible. Overloaded samples should be prepared and analyzed by indirect observation protocols.

Airborne samples should be analyzed by phase contract microscopy (PCM; NIOSH 7400), and transmission electron microscopy (i.e., TEM; AHERA, NIOSH 7402; and/or ISO 10312)

- **Environmental Area Characterization through Sampling of Dust**

Representative sampling of thin-film dust (both exterior and interior) should include use of ASTM micro-vacuum techniques to collect samples. Analyses should be conducted by both PCM and AHERA counting protocols including positive identification of fiber mineralogy by EDS. Most dust samples will require indirect preparations to determine presence of asbestoform fibers.

- **Task-based Monitoring of Personal Exposures** for the purpose of human health risk assessment.

While characterization of environmental samples is useful for determining the nature and extent of possible environmental contamination, only personal air monitoring is useful for the purpose of risk assessment for exposure to asbestos. Sampling of likely high exposure job tasks in areas with identified asbestos surface contamination can be

performed to determine the potential human health risks. This information can then be applied to risk management decisions for either area residents or exposed workers, as dictated by the situation.

Personal air monitors should be placed on a representative number of individuals working or living in environments likely to result in dust and/or asbestos fiber exposures.

Personal air monitoring should take place such that workers and residents in reasonable worst-case environments participate. Sufficient air volumes should be collected such that risk analysis for long-term low-level risks can be evaluated. Analyses should include both PCM and AHERA analyses for rapid turn-around and immediate public health decision-making. Additionally, samples can be analyzed by ISO 10312 for long-term risk evaluation.

- **Characterization of asbestos Contamination and Risks in Indoor Environments (i.e., offices and apartments) in the area of concern.**

  It is anticipated that indoor environments may be contaminated by dusts and debris related to the collapse of the WTC. In order to fully characterize possible human health risks associated with indoor exposures, A representative number of solid media, dust samples, stationary indoor air samples, and personal (task-based) samples should be collected to allow for assessment of exposures and risks in indoor environments. Indoor samples should be collected using practices and protocols consistent with exterior sampling. Analyses should be conducted as to allow for both short-term risk-based decision-making and longer-term risk analyses.

  For questions please contact Dr. Aubrey Miller, MD, MPH, US Public Health Service, at 303-844-7857.

GRACE

CONFIDENTIAL

Construction Products Division

Table 6

Fireproof Material

Monokote	MK-1	MK-3	MK-3	Formula used after 73 no Asbestos Added MK-4 CB	MK-5
Chrysotile					
7M	11.9	13.23	----	----	----
7R	----	----	12.18	----	----
Vermiculite					
L-3 34 cu. ft. 6.5 pcf	----	29.38	----	29	27.5
K-3 36 cu. ft. 7 pcf	----	----	30.69	----	----
L-2 or Screened-3, 5 - 8 pcf 56 cu. ft.	43.3	----	----	----	----
Plaster of Paris	35.7	57.29	56.89	66.1	67.2
Duponal WA Dry	----	0.10	0.24	----	----
Cellulosic Fiber	----	----	----	4.7	4.8
Glass Fiber	----	----	----	----	0.4
Soap (MKAE)*	----	----	----	0.14	0.15
Portland Cement	7.9	----	----	----	----
ZOD Concrete	1.2	----	----	----	----

*MKAE is sodium alpha-olefin sulfonate

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ZONOLITE DIVISION

TO: Pete Hollis DATE: October 3, 1969 - Page (3)

FROM: Jim Cintani SUBJECT: Monthly Situation Report September, 1969

CC: S. Titus

We should do everything we can to speed up our search for a substitute for the asbestos in our Monokote. We would certainly be at a distinct advantage if we could say our product did not contain any asbestos.

Sales in October should continue to be good. Our bag sales should be approximately 150,000 bags and our dollar sales at $250,000.00 which is just about our budgeted goals.

Sincerely,

Jim Cintani

JC/jj

GRACE
ZONOLITE
CONSTRUCTION PRODUCTS DIVISION

TO: Regional Managers DATE: April 9, 1970

FROM: Thomas F. Egan

cc: J. N. Beveridge

Gentlemen:

Developments in New York in the last week have brought the pollution hazard of asbestos in sprayed fiber fireproofing to national attention. I refer to a recent speech by Representative Richard Ottinger, New York, and the cover article of ENGINEERING NEWS RECORD, April 2, 1970, "Does Sprayed Asbestos Cause Lung Cancer?"

I want to report that we have not been idle. There has been a concerted effort to see everyone and have spoke to Dr. Selikoff, Tishman, Turner, etc. As a result, we are back in discussion on several projects that had been lost to competition, such as the World Trade Center and U. S. Steel Office Building, New York. Also, Tishman is now calling for cementitious bids on all projects.

This is to alert you to do some homework and get back after any and all projects that you have lost or those that fibers are bidding. Be very alert to the involvement of the owner and general contractor in possible lawsuits over this health hazard.

Sell the advantages of cementitious and that the fiber is locked in the mix. Push very hard on the air erosion in plenum and the present danger of the sprayed fibers being blown through the air distribution system. This is no time to be gentle, timid or really too diplomatic. You must move quickly.

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Also, I want to report that we have at least two formulations that work without asbestos. We have scheduled UL tests for full equivalency and should have them completed in July. We will have a column tested with the new product by late May. There is a real urgency on this, and I hope I'm communicating that feeling.

Please let us help if we can, but a status report on your region's efforts would be a great help.

Yours truly,

Tom

Thomas F. Egan

TFE/jac

20000543

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REMARKS DELIVERED BY CONGRESSMAN RICHARD L. OTTINGER
AT PRESS CONFERENCE TUESDAY, MARCH 24, 1970

Of all the forms of air pollution in our New York City air, the most deadly -- and least understood -- is asbestos dust. And New Yorkers are being unnecessarily exposed to thousands of tons of this dust every year.

While there are no accurate figures, we do know that in the course of the next year more than ten thousand tons of asbestos mix will be sprayed on new buildings being contructed in New York City. We also know that 50 per cent of that asbestos will escape into the surrounding air where New Yorkers have no choice but to breathe it.

There is new evidence that warns that consequences of this are far more serious than we ever guessed.

A recent survey in New Jersey showed that persons exposed to asbestos dust have a death rate 25 per cent above normal and an instance of lung cancer 700 per cent above normal.

A study conducted in England showed that a person who smokes cigarettes and is also directly exposed to asbestos dust is 92 times more likely to develop lung cancer than a non-smoker exposed to the dust.

Because of the large amount of construction in which asbestos spray is used as fire proofing, New Yorkers today are being exposed to excessive and unsafe concentrations. The evidence is already clear. Autopsies performed in three New York hospitals have indicated that 50 per cent of the people who live in New York already have cancer-causing asbestos bodies in their lungs.

more....

Now that does not mean that these bodies had already caused cancer. It takes a long time to develop cancer or other lung diseases as a result of exposure to asbestos, sometimes as long as 20 years, but you only have to be exposed to it once.

Asbestos has an infinite existence. The body does not reject it and it is never broken down. Every bit of asbestos that enters our body in any form, will stay with us until we die.

The most direct threat to us in New York City comes from the construction of large skyscrapers like the two 110-storey World Trade Center buildings. Those buildings alone will use 1,000 tons of asbestos spray, and at least 500 tons of that will escape to be breathed by unsuspecting citizens. At least two dozen other buildings over 25 storeys are now being constructed in New York and each will use more than 200 tons of asbestos -- and 50 per cent of that -- some 2,500 tons will escape into our air.

These are only the dramatic uses of asbestos. We are exposed to it in hundreds of ways. It is used in insulation of houses. It is used in electrical wiring. It is used in hundreds of products that we use in our home every day and each of these uses contributes to the total volume of dust. A little asbestos is too much and we in New York are now exposed to a great deal of it.

more....

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In 1970 we are producing and using 8 times as much asbestos as was produced worldwide in 1935 -- and we are breathing a great deal of that increase.

To give you a picture of what this means, let me tell you about an experiment conducted by Dr. William Nicholson of Mt. Sinai Environmental Labs in New York. He recently sampled air on the roof of a school one quarter of a mile away from a small construction site and three days after it had been sprayed with asbestos. The results showed a concentration of asbestos dust 1,000 times greater than normal.

The simple fact of the matter is that asbestos particles are so small that they can only be seen with an electron microscope and so light they will stay suspended in the air -- drifting with the winds -- for many many days, perhaps even months.

It is only recently that scientists have developed a technique that makes it possible for them to measure asbestos concentrations.

The City of New York has for several years been working hard to find a way to deal with this threat. They will shortly propose standards governing the use of asbestos. However, effective control is not possible without Federal action.

Under the Air Quality Control Act of 1967 the National Air Pollution Control Administration has clear authority and responsibility to set criteria and establish standards. Yet as of today they do not propose to start this until 1972. This is unconscionable.

Asbestos is the only form of air pollution definitely proven to cause cancer in human beings.

Spraying of asbestos should be banned immediately. This will work no great hardship on the construction industry. There are a number of substitutes which are fully as effective as a fire retardant as asbestos. This action cannot wait for two years. It

Engineering News-Record
MAY 7 1970 / McGRAW-HILL'S CONSTRUCTION WEEKLY / $1

C7413A

Sprayed-asbestos fireproofing work halted

Sprayed-asbestos fireproofing operations on steel-framed buildings halted last week in New York City. The stoppage resulted from regulations written after medical research showed that asbestos fibers can cause cancer of the pulmonary and gastro-intestinal tracts if ingested (ENR 4/2 p. 11).

New York City's Department of Air Resources prepared the regulations and put them into effect three weeks ago. Last week, inspectors issued summonses alleging that the fireproofing subcontractors on three building projects were in violation of the regulations. The asbestos-spray contractor on a fourth building voluntarily halted work. City officials report that the four buildings are the only jobs in the city where fireproofing operations have been under way.

Continued violations could result in departmental hearings leading to the sealing of asbestos-spraying machinery by the city.

The four projects are one of the two 110-story towers of the World Trade Center, the 54-story Standard Oil (N.J.) building near Rockefeller Center, a 40-story building at 2 New York Plaza in the financial district, and a 37-story structure in midtown Manhattan.

Ironically, the World Trade Center project was the first and only building in the city where the spray contractor had taken precautions to prevent scattering of dried asbestos. The owner, the Port of New York Authority, cooperated with the city months ago as a result of the medical studies conducted by a team of physicians.

The building's exterior on the floors where asbestos was being sprayed was tightly enclosed by tarpaulins and the asbestos-spray work area was sealed off from other interior sections. The job, however, lacked the vacuum cleaning operation as required by the regulations, according to a Port Authority official.

Empire Pyro Spray Inc., New York City, asbestos-spray subcontractor on the New York Plaza building, was summoned to a hearing by Robert N. Rickles, commissioner of the Department of Air Resources. Although the company has stopped work, the hearing was called after the company failed to guarantee it would comply fully with the regulations in the future, according to department officials. This move could lead to the first court test of the regulation.

Engineering News-Record
APRIL 16 1970 / McGRAW-HILL'S CONSTRUCTION WEEKLY / 75¢

New York City establishes regulations on asbestos-use

New York City last week clamped down on sprayed asbestos used to fireproof steel frame buildings because of the material's link to lung cancer (ENR 4/2 p. 11).

New regulations, drafted by the city's Department of Air Resources in the Environmental Protection Administration, are said to be the first of their type in the U.S.

Officials acted after medical research showed that asbestos dust could cause lung cancer. The regulations are temporary pending public hearings, after which they become a city statute.

The regulations require that the area of building being sprayed with asbestos be tightly enclosed, that waste material of asbestos content be cleaned up and placed in sealed containers and then that the area be cleaned by a vacuum cleaner. Asbestos sprayed in air ducts must be coated with a sealant to preclude exposure to circulating air.

The fireproofing material, which contains rock wool, a cementitious binder and up to 25% asbestos fiber, is forced out of a hose dry but is mixed with water pumped through a second hose.

20043070
020ETX01306

TO: William Goyalsky
Grace/New York

DATE: April 10, 1978

FROM: R. M. Vining

SUBJ: Sprayed Fire Retardants

CC: C. E. Graf - Grace/New York
R. M. Coquillette - Grace/New York

Re: Your letter of April 2, we have a product called Mono-Kote which competes with the asbestos-cement sprayed material. Our product does have a small amount of asbestos in it but the health hazard is only a small fraction of the asbestos-cement sprayed product.

We are currently working on modifying the Mono-Kote formula to replace the asbestos and have fire tests scheduled with Underwriters' Laboratories in the next two months.

The New York area has been a market we have never been able to crack with Mono-Kote. The recent publicity on asbestos has opened this door. We are currently working on trying to get a switch made at the World Trade Center and other building projects.

R. M. Vining

RMV/cmt

20086600

ZONOLITE DIVISION

TO L. P. Hollis

DATE August 6, 1969

FROM Jim Cintani

SUBJECT Monthly Situation Report
July, 1969 (cont.)

CC: S. Titus

Concrete aggregate sales should continue strong for the balance of the year. The sales of concrete aggregate increased in the Weedsport district during July. We should improve our concrete aggregate situation in this area during the second half of the year. Martin Fireproofing has secured a number of sizeable lightweight concrete contracts in the New England area. Martin is bidding jobs in the New England area much more competitively in the last six months. This may be a reflection on the reduced construction activity in the New York State area.

Both of our new applicators, Gypsum Constructors and Dermody, Foltz & Pray have complained of a loss of yield on their jobs. I have cautioned Ken Lapan at our East Hampton Plant to make sure we fill the bags properly and the correct amount of vinsol resin is in each bag. I plan to be on these applicator's next jobs to check out this yield situation.

We delivered on time the 12,500 bags of Dri Pac aggregate going to an Air Force Base in Greenland, during the month of July. The perlite furnace held up until the Dri Pac order was filled. However, the perlite furnace is now down for repairs. Fred Eaton reports that it should be back in operation within two weeks. This should allow us sufficient time to produce 10,000 bags of Dri Pac for Henderson Johnson's job in Syracuse, New York. It starts on September 1st. This is Henderson's first job and they are looking to us for guidance. It is essential we do everything we can to help them get started on the right foot.

Gypsum Constructors also have a 3,000 bag Dri Pac job shich will be ready about the same time.

The Monokote situation in New York continues to show positive signs of improvement. We are much closer to the getting results. Once we open the door on one large high rise building we are going to be in a good position to get many more. On Saturday, August 2nd,, John Ottinger and I witnessed a demonstration of Monokote sprayed on steel trusses that are going to be used on World Trade Center. The test went very well; however, the contractor is very concerned about the clean up of over spray with our material. Our success will depend on the cost that Mano DiBono attaches to our clean up verses cleean up on fibers. We should start supplying the special vermiculite that is going to be used on spandrel beams and columns on the World Trade Center during August.

The Newark Airport job (40,000 bags) has started rather slowly. The contractor is going to have to use more than one machine if he hopes to maintain any kine of schedule. We are also supplying a 4,000 bag Monokote order for Macy's Department Store in Brooklyn. Overall our Monokote picture

GRACE

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GN-9A (24M-1-68) EPC

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ZONOLITE DIVISION

TO L. P. Hollis DATE August 6, 1969

FROM Jim Cintani SUBJECT Monthly Situation Report July, 1969 (cont.)

CC: S. Titus

looks very encouraging.

George Bauer our replacement for John Fischer's territory appears to be gaining confidence. At this early point I am very pleased with results. I feel he will be a definite asset for us. During July I conducted several interviews for Rohn Anderson's position. My latest interviews were on Friday, August 1st. I was very pleased with one particular applicant. I want to do some checking on his references. If everything is favorable, I then would want to have another more detailed discussion with him.

The first six months of this year our operating profit was $59,600. This is an increase of $42,900 over our budgeted operating profit. I am hopeful we can continue to show improvement in our operating budget for the balance of the year.

Sales during August should approximate 110,000 bags, our dollar sales will be $220,000. We will achieve our bag budget but I do not think we will meet our dollar budgeted goal of $235,000.

Best Regards,

Jim Cintani

GRACE

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GN-9A (24M-1-68) EPC

008ETX02058

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25092891

New Specifications Eliminate Asbestos [illegible]

[illegible]

[illegible] rockwool [illegible] asbestos, a [illegible] come under attack because of the belief it causes lung cancer and other diseases.

The authority's announcement came as the city today completed the second of two hearings on a plan to ban the use of asbestos on buildings.

But even though the agency will use a different fireproofing substance, it already has used asbestos on the first 70 stories of the north tower of the trade center.

Although 40 more floors will be added to bring the tower to its full height of 110 stories, it already ranks among the 10 tallest buildings in the city.

There will be two such tower buildings. Construction on the the second has reached the 23rd floor. There are four other buildings in the complex.

Medical Opinion

The authority declared that rockwool will now be used on all the buildings instead of the asbestos.

The mineral, long used for insulation, is mixed with water and sprayed onto the steel structure to protect it from the effects of severe heat.

Medicial men said that research has shown that about 50 per cent of the men engaged in applying asbestos died of lung cancer.

The asbestos became a political issue because candidates charged that the authority was being permitted to pollute the environment with the asbestos dust. It was said the asbestos gets into the air and becomes a threat to the public.

According to a letter sent to Robert N. Rickles, city air resources commissioner, Austin J. Tobin, the authority's executive director, declared the new sub-

Evening News
Thursday
May 28, 1970
Newark, N.J.
29

7019197.25

The quotation of $2.00 a bag for the vermiculite with special bonding agents included in the bag was a very realistic price based on our costs. The bonding agents are a very substantial portion of the cost. I have been able to secure for you a five cent per bag reduction from our original quotation.

Attached is our formal quotation that you requested.

We appreciate the opportunity to supply you this special vermiculite fireproofing. You can rest assured that we will do everything in our power to help you make the World Trade Center not only the lagest fireproofing project in the world but in addition a most profitable venture for the Mario & DiBono Plastering firm.

Sincerely,

James Cintani

District Manager

JC/jc

cc: J. Ottinger

P. Hallin

25014236

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ZONOLITE

CONSTRUCTION PRODUCTS DIVISION

W. R. GRACE & CO. 62 WHITTEMORE AVENUE CAMBRIDGE MASSACHUSETTS 02140 617/876-1400

April 2, 1971

Mr. John Doe
The Doe Corporation
123 Main Street
Boston, Massachusetts

Dear Mr. Doe:

The city of New York on March 23, 1971 granted approval to Zonolite/Construction Products Division, W.R. Grace & Co. for the use of its

NON-ASBESTOS-FIREPROOFING PRODUCT

ZONOLITE MONO-KOTE IV
A Cementitious-Plaster Type Fireproofing

This breakthrough makes available to New York area specifiers, owners, and contractors, a spray-applied direct-to-steel fireproofing material that:

** contains no asbestos in its formulation

** is a cementitious plaster type product which guarantees

* hard setting
* no airborne innocuous materials
* high bond strength
* resistance to damage and air erosion
* uniform, tamper-proof density
* anti-pollution benefits

For information, contact our area representatives John C. Ottinger or Ed Van Vliet at our New York number (212) 661-3085, or return the enclosed card.

Very truly yours,

William K. Rogers

William K. Rogers, Manager
Eastern Region

Enc.

GRACE

25092892

AREA CODE 312 / CENTRAL 6-5885 · CABLE ADDRESS "ZONOCO" CHICAGO, ILLINOIS

7003706

ZONOLITE
DIVISION W. R. GRACE & CO.

135 SOUTH LA SALLE ST.
CHICAGO, ILLINOIS 60603

MINERS AND MANUFACTURERS OF VERMICULITE PRODUCTS

CHUCK — YOU SHOULD BE IN ON THIS AND ATTEND THE DEMONSTRATION MAC

July 20, 1967

Mr. C. Weber
Laclede Steel Company
812 Olive Street
St. Louis, Missouri 63101

Dear Mr. Weber:

It was a pleasure talking to you concerning the World Trade Center Project. We are most anxious to assist in determining the economics of spraying the joists with our Zonolite Mono-Kote fireproofing.

I have advised Mr. Soffer that we will begin on Monday, August 7 to experiment, and that on Tuesday the 8th, we should have some idea of what we can, or cannot accomplish. It is hoped that we can finish everything in the two days.

As I mentioned to you previously, we have contracted with Niehaus Plastering in St. Louis, to actually do the spraying. This accomplishes two things; it gives all interested parties an unbiased view of what can be done, since it is not being done by a laboratory crew. It also saves us the problem of hauling our equipment and personnel from various sections of the country.

Bob deBastian in St. Louis has arranged with Niehaus to supply us with a good experienced nozzleman, a mixerman, a mixer, a plaster pump, and other necessary equipment to do the spraying. We will require a water supply at the mixer, otherwise I cannot think of anything else you might supply.

You were to advise me if any difficulties might arise due to the union requirements of your plant versus the Plaster Union.

25003891

ZONOLITE DIVISION

7003707

Mr. Weber - Page 2 - July 20, 1967

Unless any of the parties receiving a copy of this letter see any problems or difficulties arising from this demonstration, then I assume we will proceed as planned. The demonstrations will take place at Laclede Steel Company, Madison, Illinois.

Very truly yours,

ZONOLITE DIVISION
W. R. Grace & Co.

M. Malter, P.E.
Manager
Plaster Products

MM:md

cc: Mr. I. Soffer - N.Y.
Mr. R. O. deBastian - St. Louis
Mr. J. C. Ottinger - N.Y.

25003892

GRACE

ZONOLITE
DIVISION W. R. GRACE & CO.

MERCHANDISE MART PLAZA
CHICAGO, ILLINOIS 60654
TELEPHONE 527-5700

April 8, 1968

Mr. J. Davis
Vice President - Engineering
Cupples Products Company
2650 South Hanley Road
St. Louis, Missouri 63144

Dear Jim:

Attached are three copies of the revised report of the vermiculite-plaster and Mono-Kote evaluation for the columns.

You will note that I withdrew all mention of lath.

Also, attached is a copy of our beam test with 1/2" of Zonolite Mono-Kote for 4-hours.

Sincerely,

ZONOLITE DIVISION
W. R. Grace & Co.

M. Malter/md

M. Malter, P.E.
Manager - Fire Protection

MM:md

Enclosures

cc: J. Cintani - Trenton
J. C. Ottinger - New York
R. O. de Bastian - St. Louis

20062565

ZONOLITE DIVISION,
W. R. GRACE & COMPANY

MASTER FORMULATION RECORD SHEET

PRODUCT Mono-kote, MK-1 DATE 12-30-63

INGREDIENTS	% BY WEIGHT	BATCH FORMULA	FORMULA COST
Vermiculite, Domestic #2 Screened No. 3 (bulk 5 to 8 pcf) 56 cu. ft.	43.3	364.0#	$8.59
Asbestos, 7M	11.9	100.0	2.90
Alpha Gypsum	35.7	300.0	7.20
Regular Portland Cement	7.9	66.7	1.00
ZOD Concentrate	1.2	10.0	7.60
	100.0	840.7	$27.29

RMS 7 LB. $.0325 SIGNED RJ Bragg

See Reverse Side for MK-3 Mono-kote

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ZONOLITE
MONO-KOTE TYPE 1

BATCH FORMULA

FOR MACHINE APPLICATION ONLY

INGREDIENTS	AMOUNT
Vermiculite, Domestic No. 2 (5 to 8 pcf)	56 cu. ft.*
OR	
Domestic, Screened No. 3 (5 to 8 pcf)	56 cu. ft.*
Asbestos Fiber (ZOA) Maximum fluffed weight - 12.3 lbs./cu.ft. Approved Grades: ~~JM7M05~~ G. Wilson M-2-7M JM7MRF Lake 7M4 Carey ~~7M1~~ 7M5-1 National Gypsum 7M1 ~~Carey 7M5~~	100 lbs.
ZOM (Alpha Gypsum) As purchased by the Zonolite Co.-contact Mr. Leo Franz, CE 6-5885, Chicago, Ill.	300 lbs.
White or Regular Portland Cement (Either approved by Underwriters Laboratories) Where higher light reflectance is needed, use White. Where ceilings are to be covered, use Regular.	66-2/3 lbs.
ZOD Concentrate (1 bag) As produced by the Zonolite Co.	10 lbs.
Approximate Total Weight	790 lbs.

Shall be packaged in 25 lb. units.

* U. L. Specification requires total weight of aggregate to be 322 lbs., plus or minus 16 lbs.

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